

Name: _____

Final Exam Study Guide

Algebra 1B 2015

***We will be completing this study guide in parts. If you know how to complete all problems on this Study Guide AND complete additional suggested items, you will do very well on the Final Exam.**

***If you choose to skip a night of studying and practice, you probably will not do as well as you would like!**

***Remember that you should also practice ADDITIONAL problems offered, actively PARTICIPATE in all classroom REVIEW, and attend TUTORIAL!**

***Twenty minutes per night starting TONIGHT!**

***Please answer all written responses in at least TWO complete sentences using at least THREE algebraic terms.**

Part One: Functions and Linear Equations

Extra Practice: p. 734 #27-40

1. Comparing: Please define relation and function and describe the relationship between the two.

2. Describe a real-world situation that can be modeled by a function.

3. Fill in the table below:

Type	Example	Describe solution algebraically	Describe solution graphically
Single-Variable Equation			
Linear Equation			
System of Linear Equations			
System of Linear Inequalities			
Quadratic Equation			

4. Writing Equations: Write an equation in the requested form using the given information.

a) Write the equation for the line in slope-intercept form that has a y-intercept of seven and a slope of one.

b) Write the equation for the line in slope-intercept form that passes through (2, -1) and (4, -5).

c) Write an equation for the line in slope-intercept form that passes through $(-8, 1)$ and is parallel to the line: $y = -\frac{1}{4}x + 2$.

d) Write an equation for the line in slope-intercept form that passes through $(2, -3)$ and is perpendicular to the line: $x - 2y = -9$.

e) Write the equation of the line in STANDARD form whose equation in slope-intercept form is $y = \frac{1}{4}x - 2$.

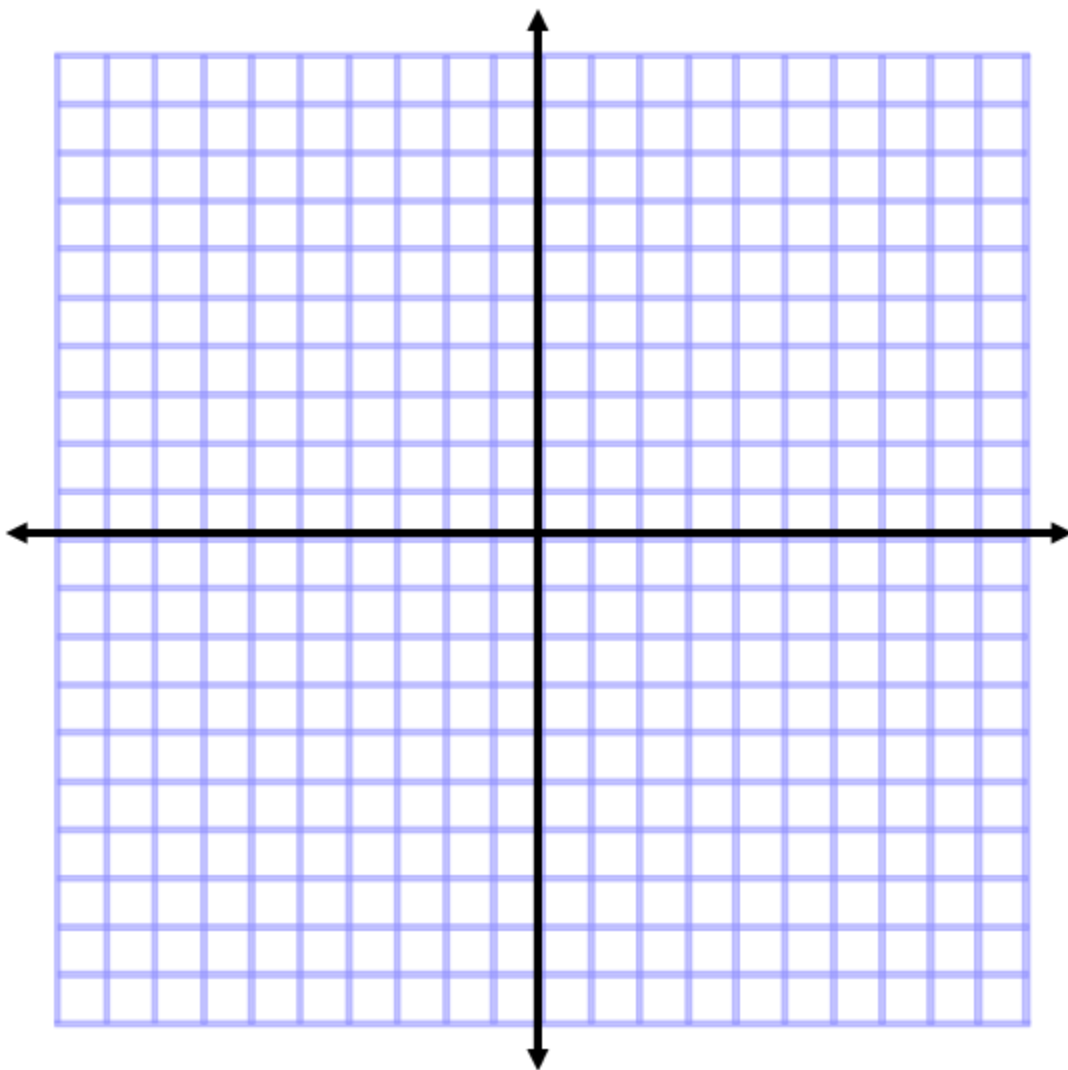
DO NOT GO BEYOND THIS POINT!!

Part Two: Systems of Linear Equations and Inequalities; Exponents

Extra Practice: p. 736 #4-12, 25-30, p.738 #1-16

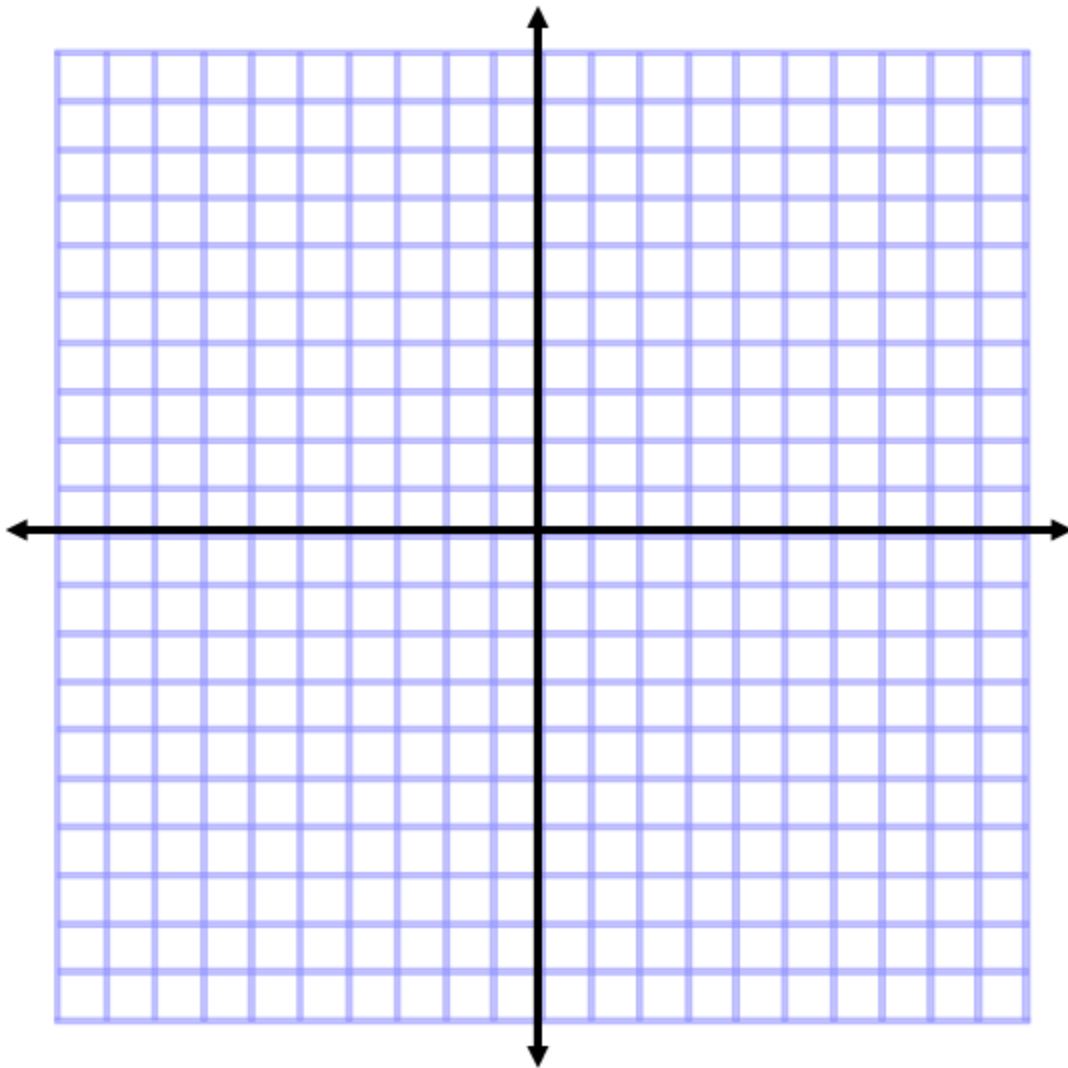
4. Graphing Linear Equations: Please graph the linear equations on the coordinate plane provided. NAME YOUR LINES.

$$y = \frac{2}{5}x - 1 \quad y = -5 \quad 3x - y = -9 \quad x = 1$$



5. **Systems:** Please solve each system **using the method of your choice** Please write your answer as a coordinate (if possible). Good advice: CHECK your work using SUBSTITUTION.

- a) Suggestion (not required): Solve by GRAPHING: $y = \frac{2}{3}x + 2$
 $2x - 3y = 6$



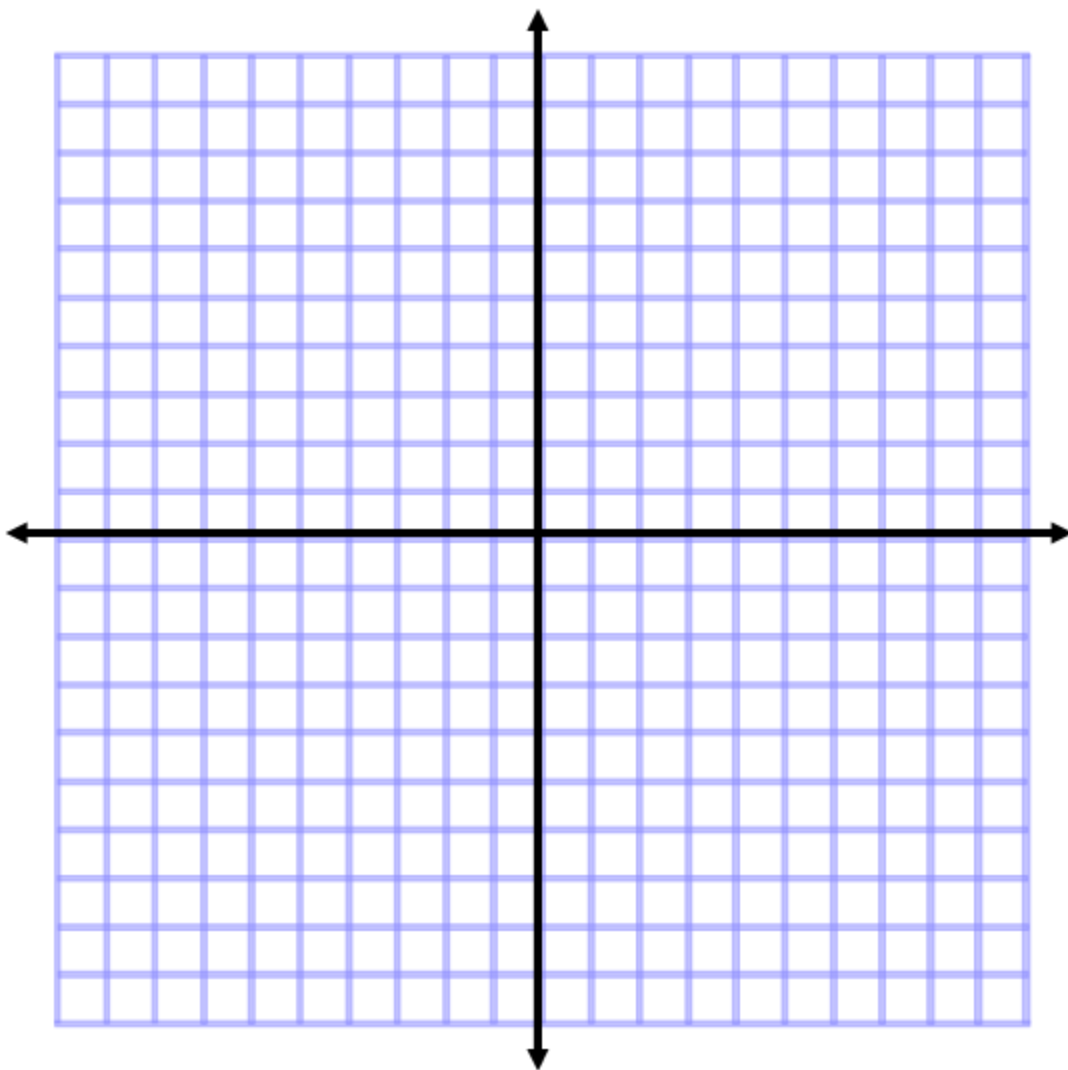
b) Suggestion (not required): Solve by SUBSTITUTION: $y = 4x - 8$
 $y = 2x + 10$

c) Suggestion (not required): Solve by ELIMINATION: $3x + 6y = -6$
 $-5x - 2y = -14$

6. Please **graph the system of linear inequalities**. Remember to NAME and EXTEND your lines. Don't forget to clearly shade the OVERLAP.

$$y < 2x + 4$$

$$-3x - 2y \geq 6$$



7. Simplify COMPLETELY (no negative exponents):

a. $(4x^2)(2x^3)^4$

b. $(8d)^{-1}$

c. $(-3,000abc^4)^0$

d.
$$\frac{2j^2k^9m^{-3}}{4j^{-4}km^2}$$

e.
$$\frac{(3a^2b^{-3}c^{-4})^{-2}}{9a^4b^{-1}c^{-5}}$$

Part Three: Naming and Operations with Polynomials; Factoring
Extra Practice: p. 740 #1-8, 11-38, 41-68

8. Write each polynomial in simplified, standard form. THEN, name the polynomial by degree and by term.

a. $-8 + 2x - x^2 + 8x$

b. $9c^3 - 2$

c. -900

d. $8/x$

9. Complete each operation. Write your answers in simplified, standard form.

a. $(2x^2y - 5x^3 - x^2 + 4) - (-6x^2y + 2x^3 + 3x^2 - 2x)$

b. $-2a^4b(a - b^3 + 3bc)$

c. $(x + 4)(2x - 7)$

d. $(4x + z)(4x - z)$

e. $(a^3 + b^2)^2$

10. **Factor:** Please factor AS COMPLETELY AS POSSIBLE!

a. $y^2 + 5y - 24$

b. $3x^2 - 10x + 8$

c. $12x^3 - 42x^2 + 16x - 56$

d. $x^2 - 16$

e. $8x^2y - 4x^2$

Part Four: Word Problems

**Extra Practice: p. 729 #67, 68; p.736-7 #13, 18, 33; p.739 #83, 85;
p.743 #65, 67**

11. Systems Word Problems: Choose Problem #1 OR Problem #2. (Note: you will also have CHOICE on the Final Exam.)

Problem #1: Ayende and Kyle own a farm with some ducks and some pigs. There are ninety-four animals on the farm and two hundred sixty-four legs. How many ducks do they have? How many pigs? **Write and solve a system of equations in order to solve the problem.**

OR

Problem #2: Sara travels in a boat for 42 miles upstream, and then 42 miles downstream. The trip upstream takes 7 hours and the trip downstream takes 6 hours. What was the speed of Sara's boat? The speed of the current? **Write and solve a system of equations in order to solve the problem.**

12. Exponential Word Problems: Choose Problem #1 OR Problem #2. (Note: you will also have CHOICE on the Final Exam.)

Problem #1: Sophie deposits \$4,590 into a savings account with a 2.8% annual interest rate. Her savings account is compounded quarterly. Assuming Sophie makes no deposits or withdrawals, how much money will be in Sophie's account after 5 years? **Write and solve an exponential equation in order to solve the problem. Round to the nearest cent, if necessary.**

OR

Problem #2: Sean is creating a fictional story in which dinosaurs are still alive. In his story, there are 568,231 dinosaurs remaining and the population is decreasing an annual rate of 4.6%. If his story is set in 2110, how many dinosaurs will still be "alive" in 2118? **Write and solve an exponential equation in order to solve the problem. Round to the nearest dinosaur (whole number), if necessary.**

13. Geometry Word Problems: Choose Problem #1 OR Problem #2. (Note: you will also have CHOICE on the Final Exam.)

Problem #1: Malcolm is standing ten feet away from the base of a tree, trying to rescue a cat that is stuck twenty-three feet high in the tree. Write and solve an algebraic equation to figure out the length of ladder Malcolm will need to rescue the cat, assuming he is going to stay ten feet away from the tree. Round to the nearest hundredth, if necessary.

OR

Problem #2: Renee has a cylindrical container that is ten inches high and has a diameter of three inches. What volume of water, in cubic inches, can her container hold? Round to the nearest hundredth, if necessary. (Volume of a cylinder = Area of base * height.)

14. Quadratic Word Problem: Choose Problem #1 OR Problem #2. (Note: you will also have CHOICE on the Final Exam.)

Problem #1: Baily throws a ball from an initial height of seven feet with an initial upward velocity of forty feet per second. After how many seconds will the ball hit the ground? Round to the nearest hundredth, if necessary.

OR

Problem #2: Natasha punts a football from an initial height of 3 feet with an initial upward velocity of 48 ft/sec. After how many seconds will the ball reach its maximum height? What will the maximum height be? Round to the nearest hundredth, if necessary.

Part Five: Multiple Choice, Quadratics and Transformations

Extra Practice: p. 742 #5-11, 21-38

15. Multiple Choice: Write the CAPITAL LETTER of the correct answer in the blank provided.

a. _____ The zero product property states that:

- a) if $ab = 0$, then $a = 0$ and $b = 0$.
- b) if $ab = 0$, then neither a or $b = 0$.
- c) if $ab = 0$, then either $a = 0$, $b = 0$, or a and b both $= 0$.
- d) $a(0) = 0$ and $b(0) = 0$.

b. _____ The first step to factoring is always:

- e) checking for the GCF
- f) completing the reverse FOIL process
- g) FOILing
- h) crying

c. _____ Multiplying a trinomial by a polynomial with five terms requires _____ multiplications:

- a) three
- b) five
- c) eight
- d) fifteen

d. _____ The factored form of $a^2 - b^2$ is:

- e) $(a - b)(a + b)$
- f) $(a - b)(a - b)$
- g) $(a + b)(a + b)$
- h) $(a^2 - b^2)(a^2 - b^2)$

e. _____ You have sixteen grams of a certain bacteria that increases by a rate of 18% hourly. How many grams of the bacteria will remain after fourteen hours? Which equation correctly models this situation?

- a) $0 = -16t^2 + 18t + 14$
- b) $y = 16 * 1.18^{14}$
- c) $y = 16 * 0.82^{14}$
- d) $y = 18x + 14$

f. _____ A ball is thrown on Earth with an upward velocity of eighteen feet/sec from an initial height of fourteen feet. After how many seconds will the ball hit the ground? Which equation correctly models this situation?

- e) $0 = -16t^2 + 18t + 14$
- f) $y = 16 * 1.18^{14}$
- g) $y = 16 * 0.82^{14}$
- h) $y = 18x + 14$

g. _____ $(6.0 * 10^{-8})(4.0 * 10^{12}) =$ _____. Answer must be in proper scientific notation.

- a) $24 * 10^4$
- b) $10 * 10^4$
- c) $2.4 * 10^3$
- d) $2.4 * 10^5$

16. Analyzing the Graphs of Quadratic Functions: Fill in the table.

QF	Does the parabola open upward or downward?	Is the vertex a minimum or maximum?	Is the parabola narrower, wider or the same width as parent QF?	Write the axis of symmetry equation.	Write the coordinates of the vertex.
$y = -1/2x^2$					
$y = x^2 - 4$					
$y = -19x^2 + 8$					
$y = -x^2 + 6x$					

17. Quadratic Knowledge

a. Write the equation of the parent quadratic function:

b. Write the coordinates of the vertex of the parent quadratic function: (____, ____)

c. Write the quadratic formula.

x =

18. Graphing a Function in the Form: $y = ax^2 + bx + c$. Graph the function on the coordinate plane on the following page. Fill in ALL requested information.

$$y = -1/2x^2 + 2x - 3$$

axis of symmetry equation: _____

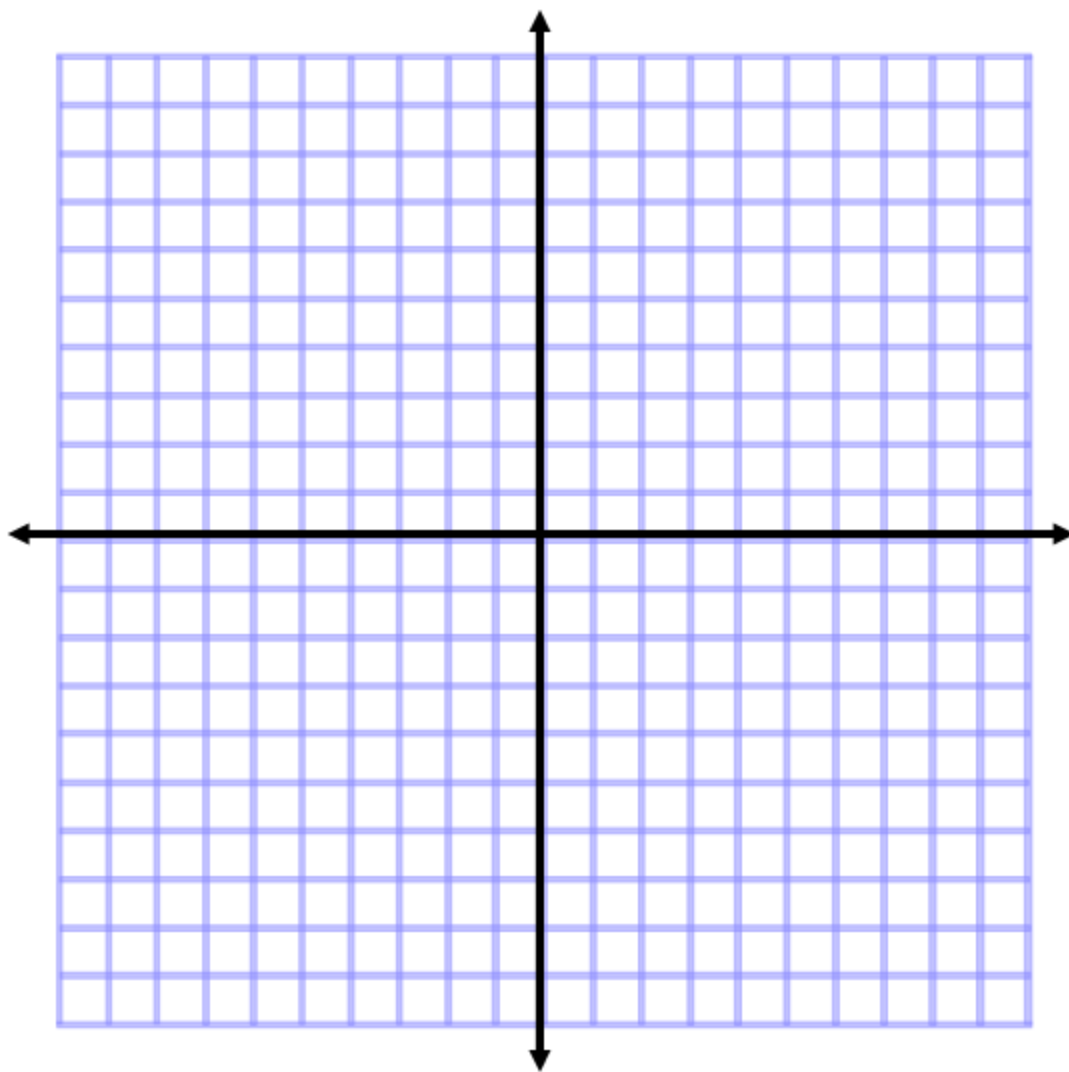
vertex: (____, ____)

point #1: (____, ____)

reflection of point #1: (____, ____)

point #2: (____, ____)

reflection of point #2: (____, ____)



19. Quadratic Equations: Please solve the following quadratic equations using a method of your choice.

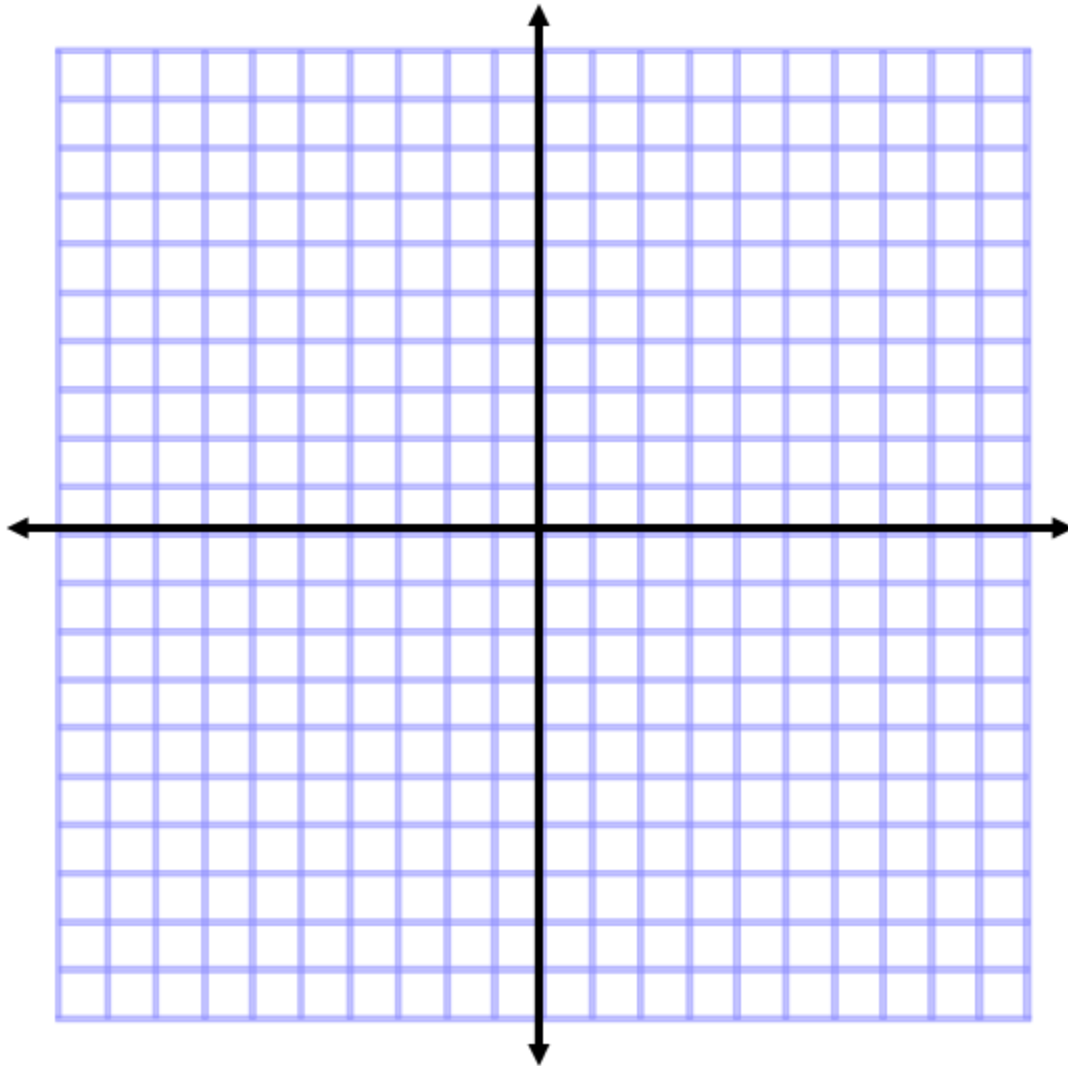
a) $-x^2 - 3 = 0$ (suggestion: sketch the graph of the related QF)

b) $4x^2 + 1 = 5$ (suggestion: square root method)

c) $10x^2 - 41x = 18$ (suggestion: factor or use quadratic formula)

20. a. Graph the quadrilateral with the given vertices. LABEL and CONNECT the vertices.

A (4, 5) B (4, -2) C (6, 5) D (6, -2)



b. Reflect the quadrilateral over the y-axis. LABEL and CONNECT the vertices and write the new vertices below.

A' (____, ____) B' (____, ____) C' (____, ____) D' (____, ____)

c. Translate your quadrilateral from part b two units down and one unit to the right. LABEL and CONNECT the vertices and write the new vertices below.

A'' (____, ____) B'' (____, ____) C'' (____, ____) D'' (____, ____)

4. Fill in the table below.

	Defining Features	Equation	Graph
Linear Functions			
Exponential Functions			
Quadratic Functions			

ALSO RADICALS!!